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Black petrel distribution and range-wide overlap with pelagic longline fisheries

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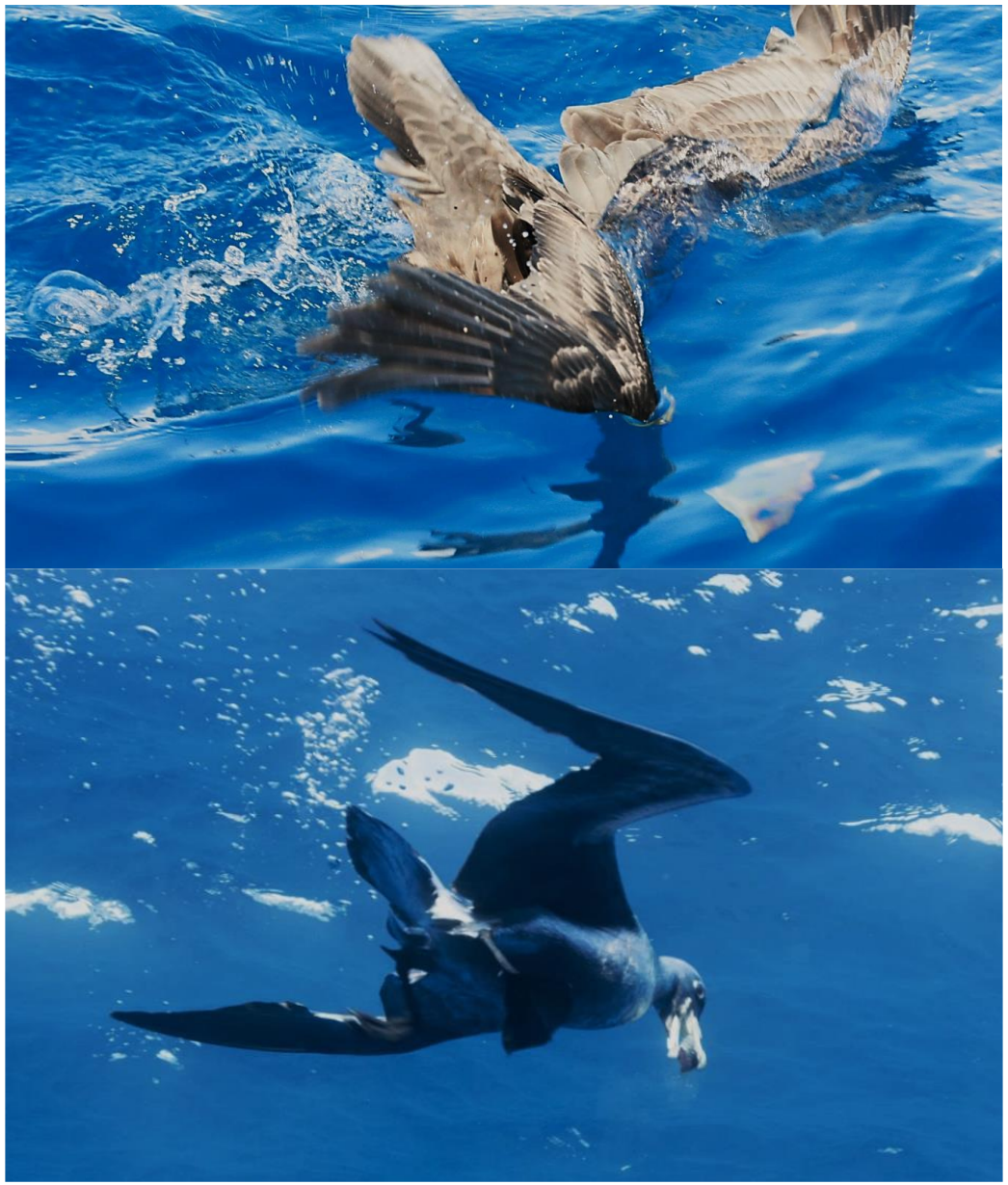
The Black Petrel (*Procellaria parkinsoni*) is a vulnerable species nesting exclusively in Great & little Barrier island (aprox: 5,500 bp) in northern New Zealand. The Department of Conservation & IMARPE, supported by their Secondment Program Participated in the nesting monitory of Black petrel In Hirakimata (Mount Hobson) in Great barrier island



Black petrel diving capabilities:

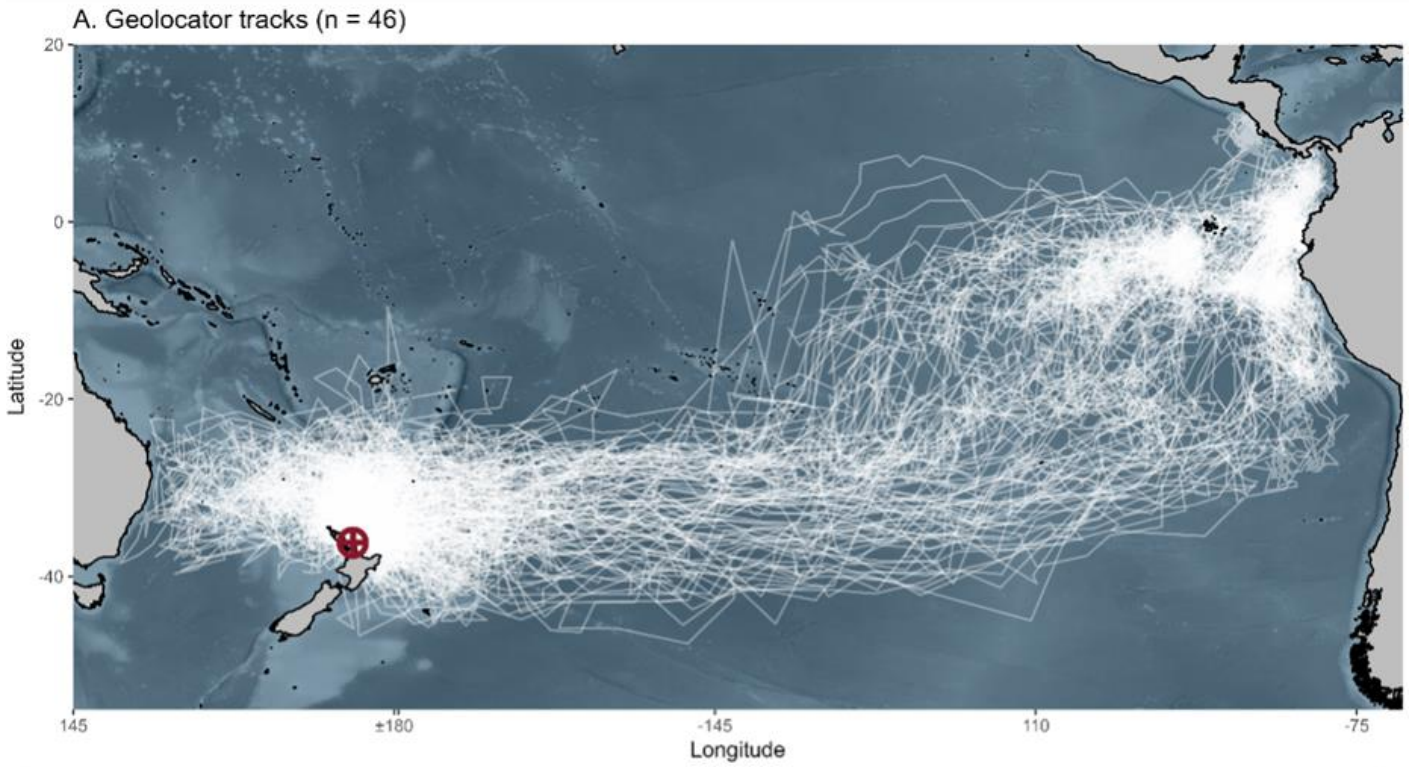
*They dive beyond 20 mt depth, reaching up to 38 mt

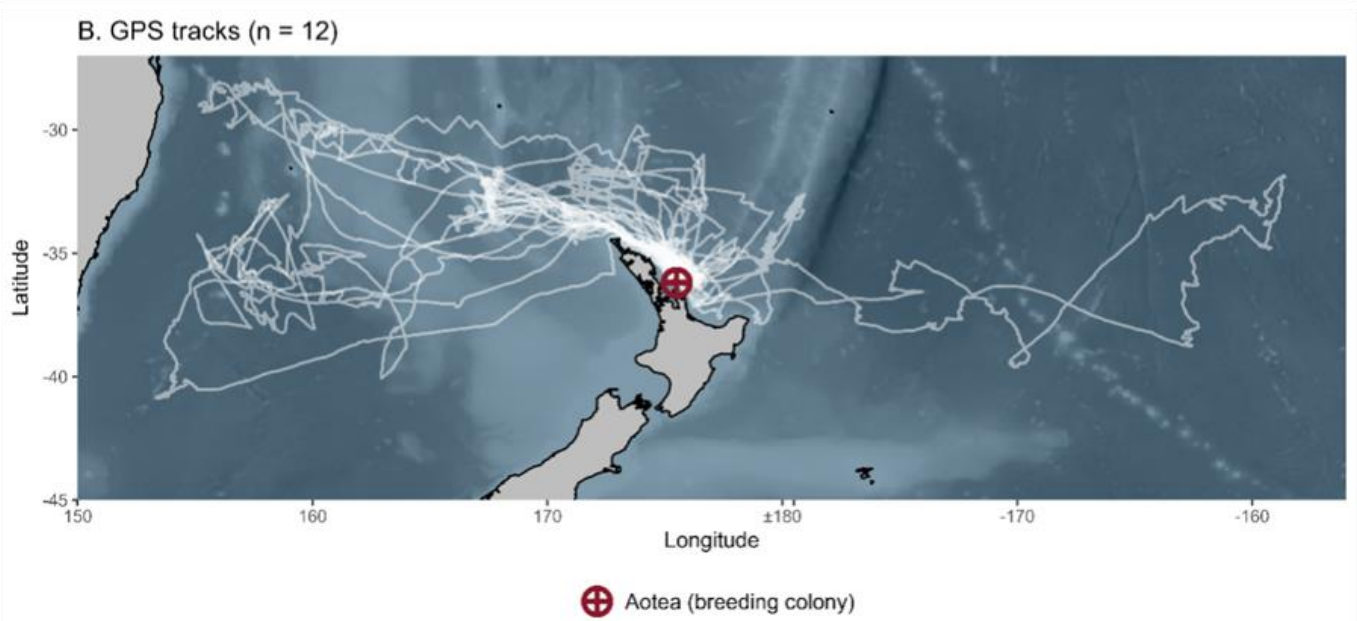
*Dive faster (0.8 m/s) than hooks sink rates (<0.5 m/s)

*They are capable to dive at night

*They can retrieve baited hooks to the surface, plaicing
At risk to other species with less diving capabilities
Such as albatrosses

*Are susceptible to bycatch when mitigation measures (Tori lines, line weighting, night setting) are used in Isolation.





Black petrel spatial distribution

*We combine GLS (n=46, 2018 – 2019) with GPS (n=12, 2023 -2024) placed in adults In Hirakimata Mountain (GBI).

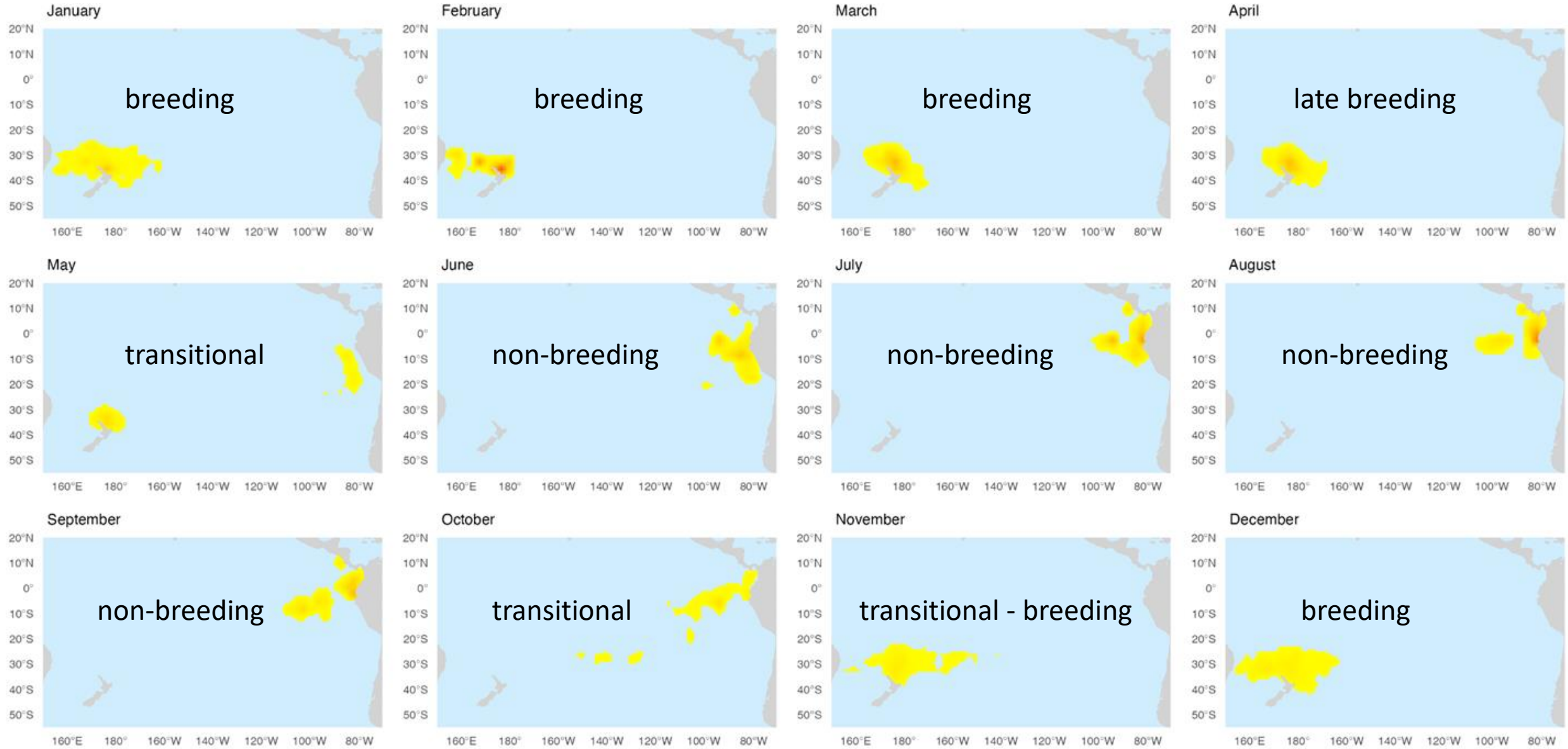
*Geolocators were processed in R using probGLS package (Merkel et al, 2016).

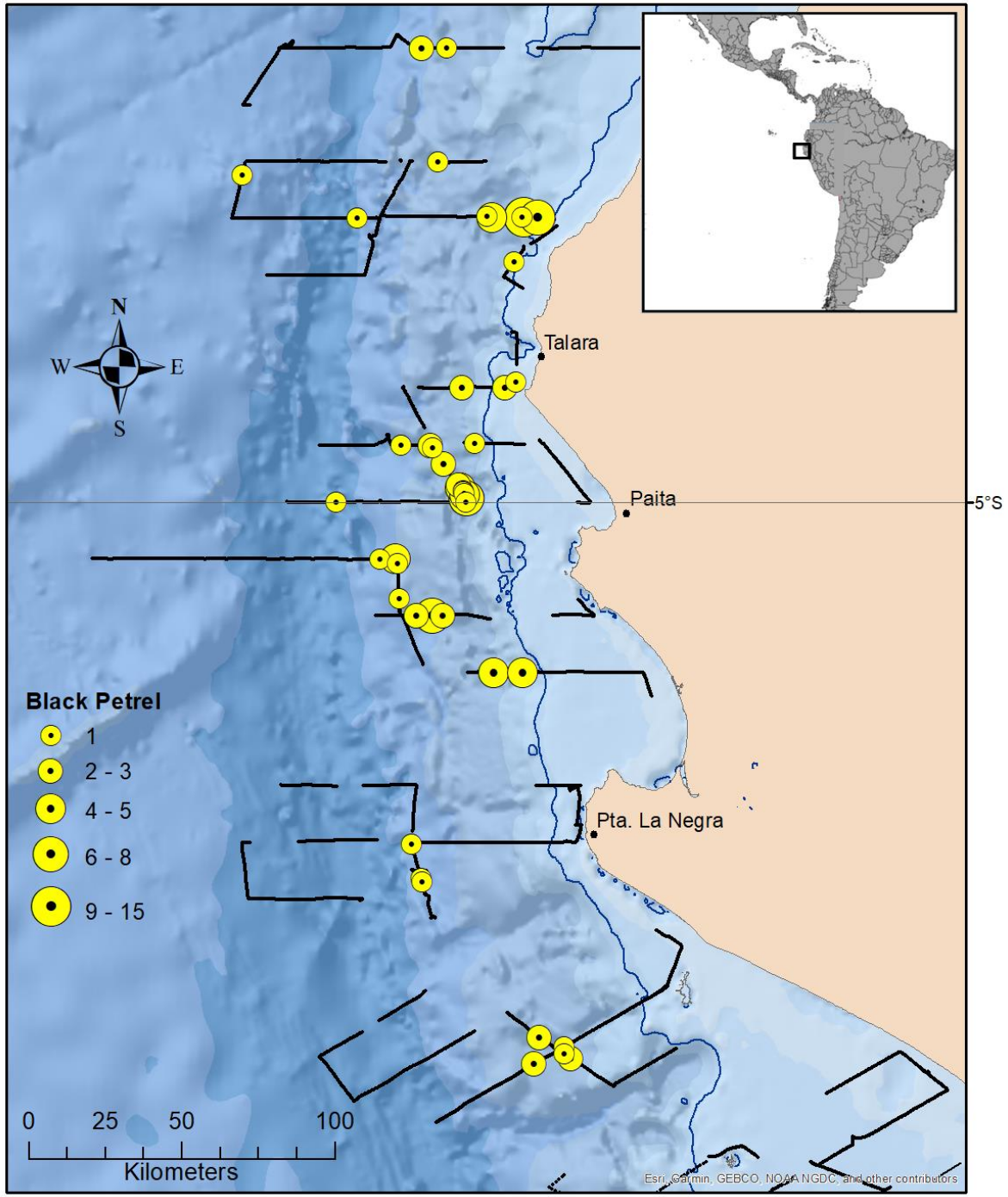
*The annual range extends from Eastern Australia to the west of South America (SA).

*In SA, in the north up to Panama Gulf and Nicaragua, and in the south in offshore waters of the Peruvian – Chilean elbow.

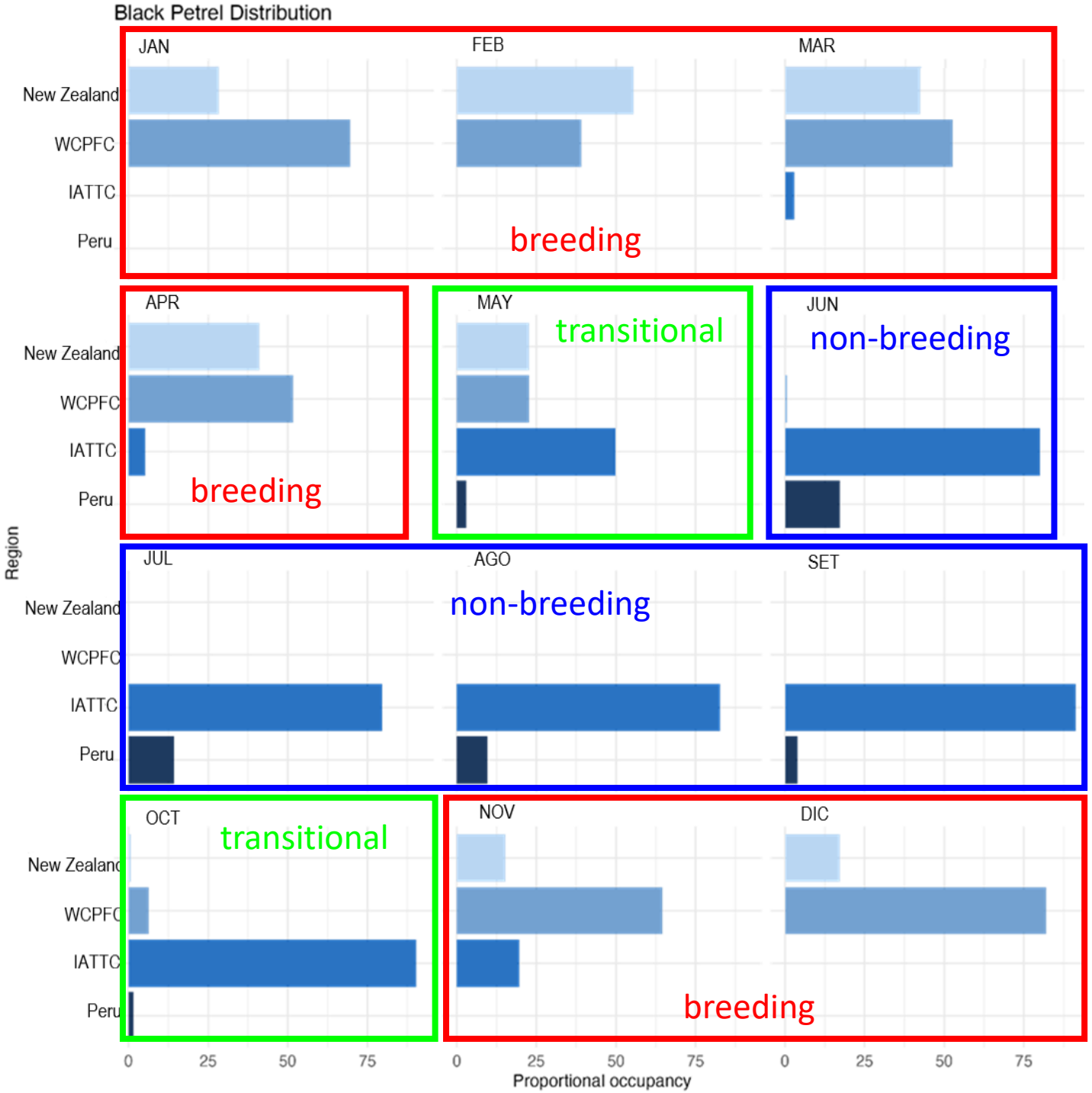
*For a complete description of the data collection protocols & processing methodology see Darby et al. (2024).

Processed monthly Black Petrel distributions, created using a combination of geolocator and GPS data.





Still during their breeding period we have register several black petrels over the continental slope in austral summer, Obtained by on board research vessels, so probably they were fledglings or juveniles.



Monthly Black Petrel distributions by region & Jurisdiction.

*Bars titled New Zealand and Peru represent Black Petrel occupancy in the respective EEZs.

*WCPFC represents fisheries management region excluding of New Zealand EEZ and IATTC overlap.

*IATTC represents fisheries management region excluding Peru EEZ.

*Near total occurrence within the New Zealand EEZ and WCPFC Convention Area during the breeding period (November-April).

*Near total occurrence in the Peru EEZ and IATTC Convention Area during the non-breeding period (June-September)

Pelagic Longlining effort & Fisheries overlap

To assess range-wide fisheries overlap with Black Petrel distribution we used:

a) New Zealand domestic fisheries data
b) Peruvian domestic fisheries data
c) Global Automatic Identification System (AIS) data

*Domestic fishing effort was quantified at a spatial resolution of 1° × 1°. using temporally averaged data, for New Zealand (2017, 2018, 2019) for Peru (2018, 2019, 2021)

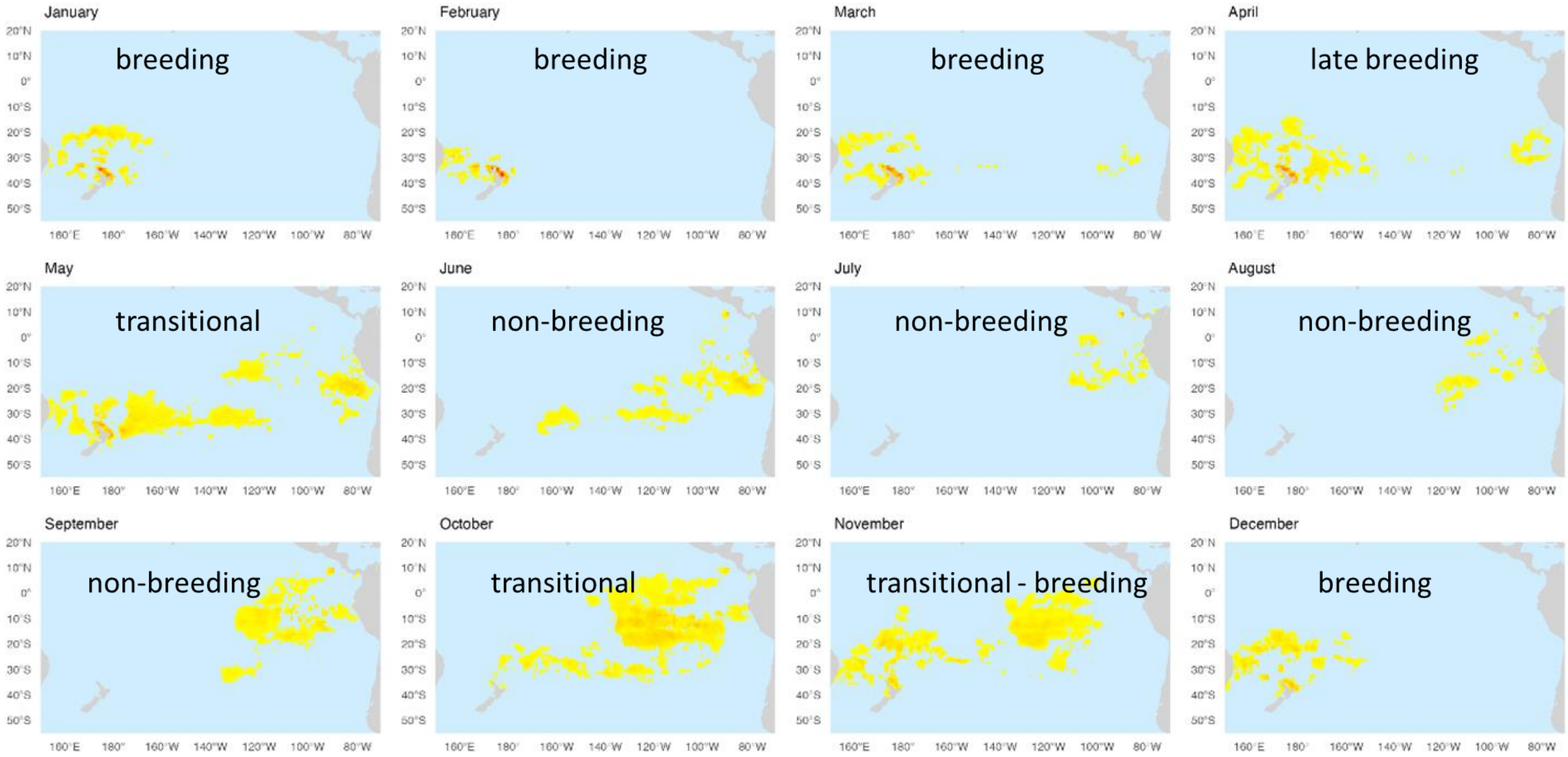
*Within the WCPFC and IATTC fishing effort was derived from global AIS data curated by Global Fishing Watch using > 70,000 vessels (2012 – 2025).

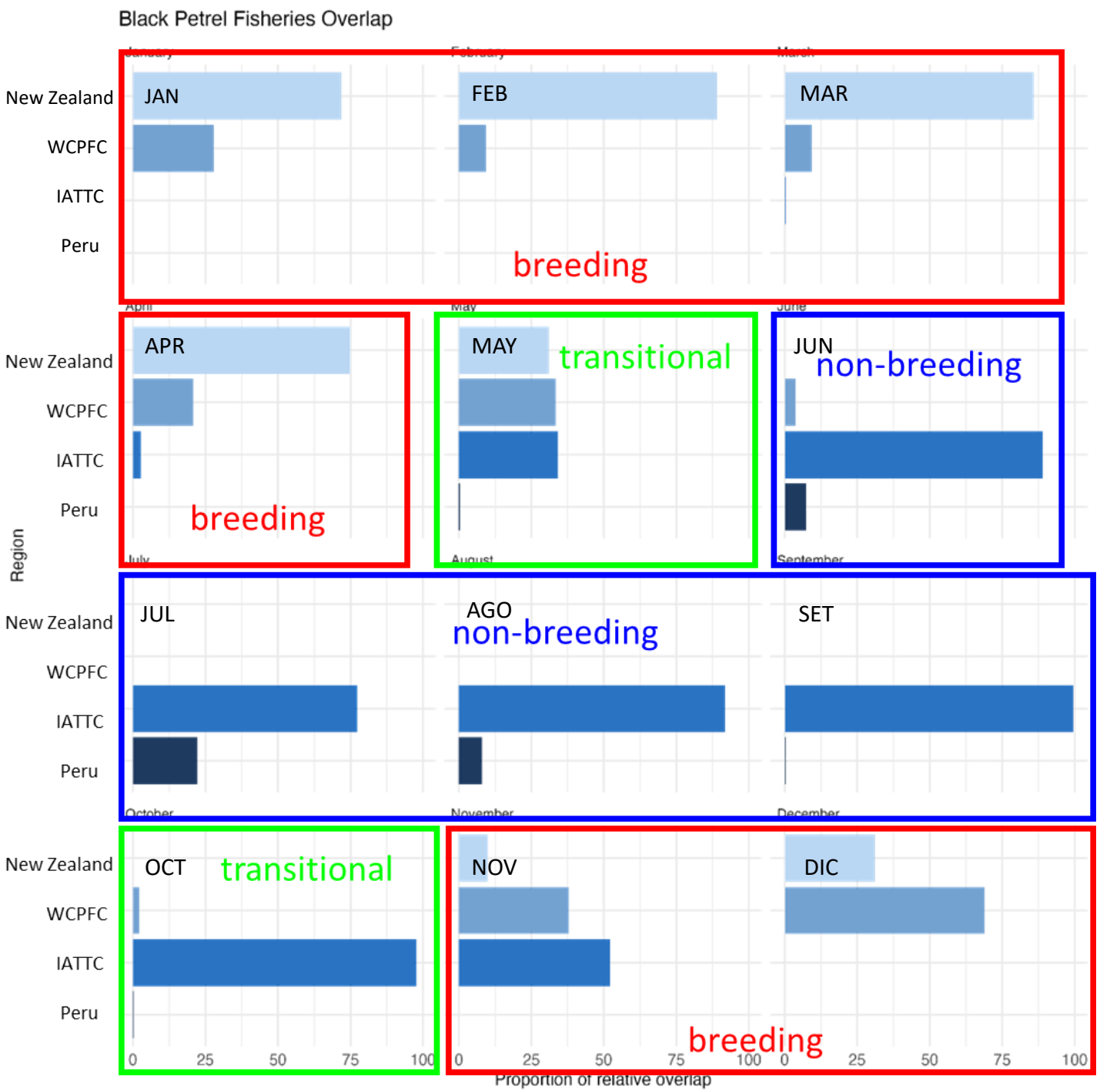
*Effort was the average number of hooks deployed per day per degree square and was disaggregated by month to capture seasonal variation in fishing activity.

*Monthly overlap rasters were generated by multiplying the species distribution raster by the corresponding fishing effort raster for each calendar month.

*The resulting values—expressed as the product of bird-days and fishing effort (hooks/day/degree)—provided a relative index of overlap in estimated hooks per bird per day per degree. This metric served as a proxy for potential interaction risk

Range-wide overlap between Black Petrel and pelagic longline fisheries. Heat maps illustrate the degree of relative overlap, with colours transitioning from yellow to red, where red indicates the highest levels of bird-vessel interaction.





Monthly overlap between Black Petrel and fisheries by management region

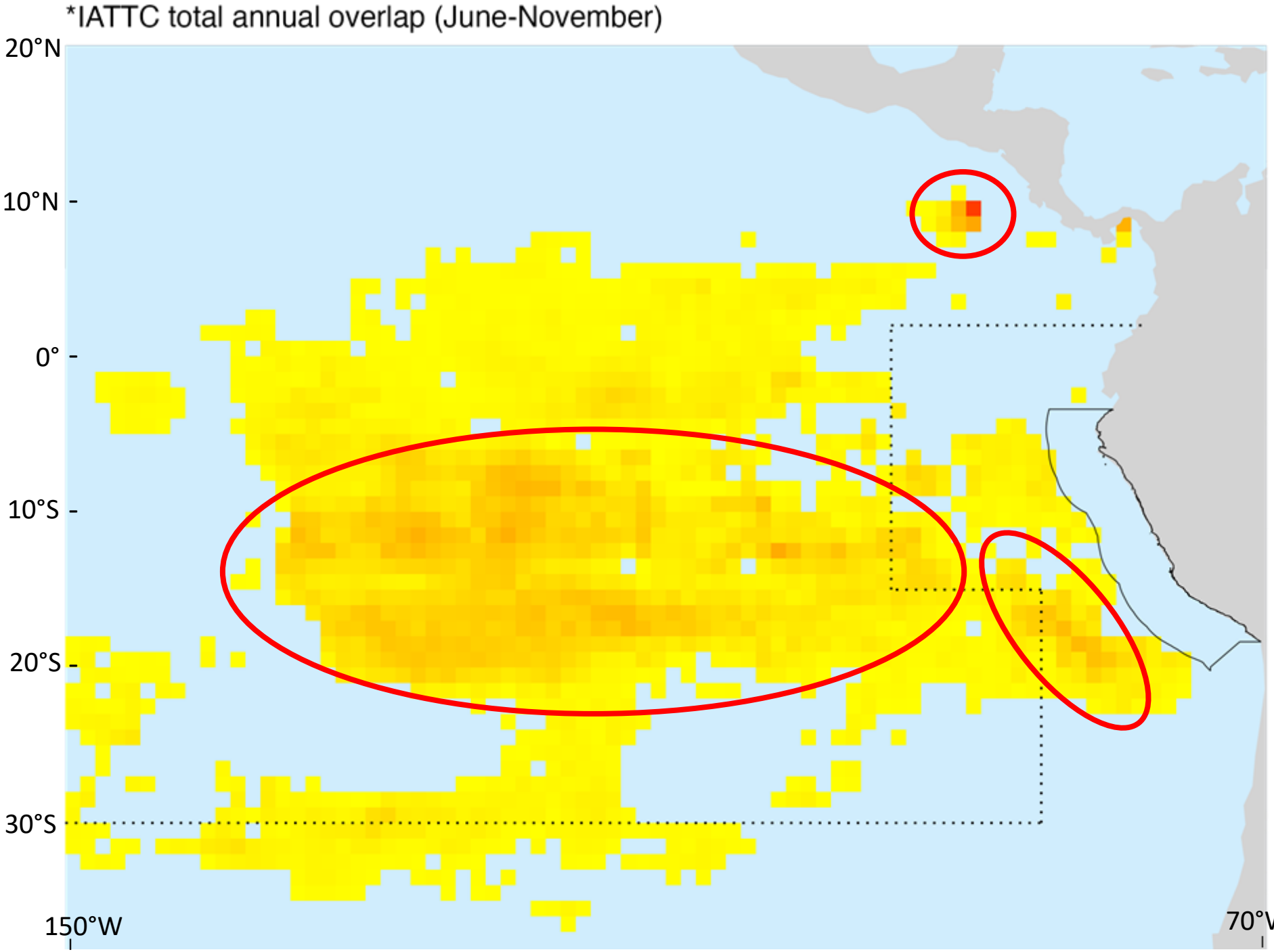
*Fine-scale spatiotemporal patterns of overlap largely reflected Black Petrel occurrence rather than pelagic longline fishing effort.

*Overlap being centred in the New Zealand EEZ and the WCPFC Convention Area during the breeding period (December-April).

*Overlap being centred within the IATTC Convention Area during the non-breeding period and transitional (June-October).

*in the Eastern Pacific, **a major overlap hotspot was identified off the coast of Costa Rica and Nicaragua.**

*



Total overlap between pelagic longline fisheries effort and Black Petrels within the IATTC region (Jun-Nov)

*Main 3 hot spots of overlap:

a) A big area in international waters off Peru, between 90°W to 130°W and 05°S to “0°S (all within IATTC area).

b) Another area in international waters off central & Southern Peru, between 250 to 450 nautical miles offshore.

c) A small but strong hotspot off the coast of Costa Rica and Nicaragua.

*** Considerable proportions of the overlap occur in areas where no seabird bycatch mitigation use is required by IATTC under Resolution C-11-02**

Thank You

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